

Claims

1. A method comprising disrupting a biological sample in a ball mill loaded with disrupting particles that are not substantially spherical.

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2. The method of claim 1, the particles having a jagged surface.

3. The method of claim 1, the particles having one or more sharp edges or corners.

10 4. The method of claim 1, the particles comprising screw-bits, cone balls, pins, or non-spherical shot.

5. A method comprising disrupting a biological sample in a ball mill loaded with substantially spherical disrupting particles that have been roughened prior to use.

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6. The method of claim 5, where the particles have been roughened by sanding, forming grooves within a surface of the particles, a ball peening process, an electric discharge processes, or by embedding a material within a surface of the particles.

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7. A method comprising increasing a yield of nucleic acids from a biological sample by disrupting the sample in a ball mill loaded with disrupting particles that are not substantially spherical instead of substantially-spherical disrupting particles of about the same size and density.

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8. The method of claim 7, where increasing a yield comprises increasing a 28S/18S ratio.

9. A method comprising decreasing the disruption time of a biological sample by disrupting the sample in a ball mill loaded with disrupting particles that are not substantially spherical instead of substantially-spherical disrupting particles of about the same size and density.

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10. A method comprising disrupting a biological sample in a ball mill that includes a vial having an inner surface that is jagged or has been roughened prior to use.

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11. The method of claim 10, where the inner surface has been roughened by sanding, forming grooves within the surface, a ball peening process, an electric discharge processes, or by embedding a material within the surface.
- 5 12. A method comprising disrupting a biological sample in a mill that includes a vial with an internal grill configured to contribute to disruption.
13. The method of claim 12, where the mill is a ball mill.
- 10 14. An apparatus comprising a ball mill including disrupting particles (a) that are not substantially spherical or (b) that are substantially spherical, which have been roughened prior to use.
- 15 15. The apparatus of claim 14, the particles having a jagged surface.
16. The apparatus of claim 14, the particles having one or more sharp edges or corners.
17. The apparatus of claim 14, the particles comprising screw-bits, cone balls, pins, or non-spherical shot.
- 20 18. An apparatus comprising a ball mill including a vial having an inner surface that has been roughened prior to use.
19. The apparatus of claim 18, where the inner surface is jagged.
- 25 20. An apparatus comprising a ball mill including a vial with an internal grill configured to contribute to disruption.
21. The apparatus of claim 20, where the mill is a ball mill.
- 30 22. A kit comprising:
 - (1) disrupting particles (a) that are not substantially spherical or (b) that are substantially spherical, which have been roughened prior to use; and
 - (2) a lysis buffer for biological samples.

23. The kit of claim 22, further comprising a vial.
24. The kit of claim 23, the vial having an inner surface that has been roughened prior to use.
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25. The kit of claim 23, the vial including an internal grill configured to contribute to disruption of a sample.
26. A method comprising disrupting a biological sample in a ball mill using disrupting particles
10 having a largest dimension greater than or about equal to 4 mm, the method not comprising plating of yeast or bacteria.
27. The method of claim 26, the particles being substantially spherical.
- 15 28. The method of claim 26, the particles comprising steel spheres.
29. The method of claim 28, the spheres having a diameter of 3/16, or 7/32 inches.
30. The method of claim 26, the particles comprising diagonals or coneballs.

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